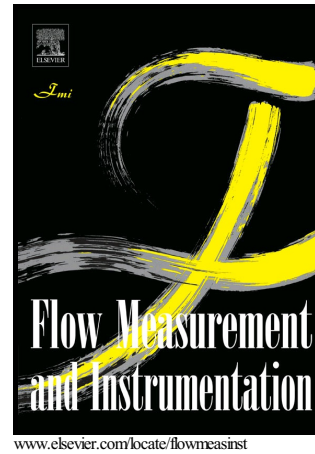


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# Numerical and experimental studies on hydrodynamic characteristics of sleeve regulating valves

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## Abstract

The sleeve regulating valve is a kind of control valve, which widely used in natural gas transportation. Jet flow generated in valve throats will impact on the surface of the valve body and the valve clack, and then cause the destruction of the valve. In this work, two regulators were designed to reduce the hydraulic impacts, and the effects of regulators on the hydraulic performance of the sleeve regulating valve are investigated in detail. Numerical and experimental studies were applied. Results indicate that the introduction of a regulator reduces the value of flow coefficient ( $K_V$ ), and the reduction is greater with larger valve opening. Meanwhile, the flow coefficients for the valve with regulator I is a bit larger than that with regulator II. The results also demonstrate that the employment of regulator decreases the entropy production rate (EPR) of high EPR regions, reduces the pressure drop of valve throats, and slows down the velocity in the valve throats. Thus the impacts of the fluid on the throat walls are weakened by regulators. It is noted that the reduction of impact forces with regulator I (has small round holes) is larger than that with regulator II (with two rows of oval holes).

## Keywords

Sleeve regulating valve, Regulator, Hydrodynamic characteristics, Experiment, Simulation

## 1. Introduction

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